P-7.1 Explain the particulate nature of light as evidenced in the photoelectric effect.

Revised Taxonomy Levels 2.7 B <u>Explain</u> conceptual knowledge
This concept was not addressed in physical science

It is essential for students to

- Understand the characteristics of the electromagnetic spectrum
- Understand the photoelectric effect as "The emission of electrons by a substance when illuminated by electromagnetic radiation is known as the photoelectric effect."
  - Understand the laws of photo emission and how they describe the nature of electromagnetic radiation
    - The rate of emission of photoelectrons is directly proportional to the intensity of the incident light
    - The kinetic energy of photoelectrons is independent of the intensity of the incident light
- Understand the quantum theory and the equation E = hf where f is the frequency in hertz, h is Plank's constant, and E is energy expressed in joules

Assessment

The verb <u>explain</u> means that the major focus of assessment should be for students to "construct a cause and effect model". In this case, assessments will ensure that students can model the nature of light based on classic experiments. Because the indicator is written as <u>conceptual knowledge,</u> assessments should require that students understand the "interrelationships among the basic elements within a larger structure that enable them to function together." In this case, assessments must show that students can construct a cause and effect statement relating how the laws of photoemission define the particle nature of light